Subventricular zone

The Subventricular zone (SVZ) is situated along the ependymal cell layer, dividing the ventricular area and subventricular zone.

The subventricular zone (SVZ) is a term used to describe both embryonic and adult neural tissues in the vertebrate central nervous system (CNS). In embryonic life, the SVZ refers to a secondary proliferative zone containing neural progenitor cells, which divide to produce neurons in the process of neurogenesis.

The primary neural stem cells of the brain and spinal cord, termed radial glial cells, reside in the ventricular zone (VZ) (so-called because the VZ lines the developing ventricles).

In the developing cerebral cortex, which resides in the dorsal telencephalon, the SVZ and VZ are transient tissues that do not exist in the adult.

However, the SVZ of the ventral telencephalon persists throughout life.

Of the many factors influencing the survival of patients with High-grade gliomas, proximity to the subventricular zone (SVZ) is one of the key influencers. In this context, 5-aminolevulinic acid Fluorescence-guided multiple sampling (FGMS) offers the prospect of understanding patient-to-patient molecular heterogeneity driving the aggressiveness of these tumors. Using high-resolution liquid chromatography-mass spectrometry (MS)/MS proteomics for HGGs from seven patients (four SVZ-associated and three SVZ nonassociated), this study aimed to uncover the mechanisms driving the aggressiveness in SVZ-associated (SVZ+) HGGs. Differential proteomics analysis revealed significant dysregulation of 11 proteins, of which 9 proteins were upregulated and 2 were downregulated in SVZ+ HGGs compared to SVZ-non-associated (SVZ-) HGGs. The gene set enrichment analysis (GSEA) of the proteomics dataset revealed enrichment of MYC targets V1 and V2, G2M checkpoints, and E2F targets in SVZ+ HGGs. With GSEA, we also compared the pathways enriched in glioma stem cell subpopulations and observed a similar expression trend for most pathways in our data. In conclusion, this study reveals new and emerging insights on pathways that may potentially contribute to greater aggressiveness in SVZ+ HGGs. Future studies using FGMS in larger cohorts are recommended to help uncover the proteomics and molecular basis of aggressiveness and stemness in HGGs [1)].

There are several sources of neural stem cells such as human embryonic stem cells, human fetal brain-derived neural stem/progenitor cells, human induced pluripotent stem cells, direct reprogrammed astrocytes.

Stem cell sciences are a promising tool for research purposes as well as therapy. Induced pluripotent stem cells appear to be very useful for human neuron studies, allowing the creation of defined neuron populations, particularly for neurodevelopmental and neurodegenerative diseases as well as ischemic events. Neural stem cell sciences have a promising future in terms of stem cell therapy as well as research. There is, however, still a great need for further research to overcome obstacles [2)].

Lining the lateral ventricles, where neural stem cells and progenitor generate new neurons (Neuroblast) that migrate to the olfactory bulb via the rostral migratory stream. However, recent work has shown these cells migrate to the striatum in humans and not the olfactory bulb

Neural progenitor cells (NPCs) in the subventricular zone (SVZ) hold promise for future therapy for neurodegenerative disorders, because the stimulation of adult neurogenesis could potentially restore the function of degenerating neurons and glia. To obtain more knowledge on these NPCs, van Strien et al., developed a method to specifically isolate NPCs from postmortem adult human brains based on the expression of the specific human adult neural stem/progenitor cell marker glial fibrillary acidic protein δ (GFAPδ). An extensive immunophenotyping analysis for cell surface markers resulted in the observation that CD271 was limited to the SVZ-derived GFAPδ-positive cells. CD271+ cells developed into neurospheres and could be differentiated into astrocytes, neurons, and oligodendrocytes. They are the first to show that a pure population of NPCs can be isolated from the adult human SVZ, which is highly instrumental for developing future therapies based on stimulating endogenous SVZ neurogenesis [3].

1)
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